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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/699,360

10/31/2003

Eric S. Olson

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TENSORCOMM, INC.

c/o iSherpa Capital

6400 S. Fiddler's Green Circle, Suite 650

Greenwood Village, CO 80111

EXAMINER

MALEK, LEILA

ART UNIT

PAPER NUMBER

2611

MAIL DATE

DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/699,360	<b>Applicant(s)</b> OLSON ET AL.	
	<b>Examiner</b> LEILA MALEK	<b>Art Unit</b> 2611	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 08 April 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 12-21, 24-29 and 32 is/are rejected.
- 7) ☒ Claim(s) 10, 11, 22, 23, 30 and 31 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 October 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114.

Applicant's submission filed on 03/20/2008 has been entered.

### ***Response to Arguments***

2. Applicants' arguments filed on 03/20/2008 have been fully considered but they are not persuasive.

**Applicants' Argument:** Applicants argue, on page 8, last paragraph, that the two cited references (Madhow and Affes) are in different fields of endeavor, and therefore the elements cited by the examiner from Affes for combination would not be combinable with the interference matrix and demodulator taught by Madhow.

**Examiner's Response:** Examiner respectfully disagrees. Examiner asserts that both references are addressing the issue of interference suppression in CDMA communication systems (see the abstracts of Madhow and Affes). Therefore they are in the same field of endeavor.

**Applicants' Argument:** Applicants argue, on page 9, first paragraph, that there is no motivation suggested in Madhow to combine these vectors linearly to form

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a single vector since that would alter the direction of the suppression itself, and would constitute a teaching away from Madhow's invention.

**Examiner's Response:** Examiner respectfully disagrees. Examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation, as cited in previous office actions has been obtained from the secondary reference (see Affes column 23, lines 17-21). Furthermore, Madhow discloses having interference vectors (see column 6, line 58) and teaches using the vectors to substantially reduce energy from one or more of the signals (see column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow discloses all the subject matters claimed in claim 1, except for generating a vector that is a linear combination of one or more interference vectors. Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18); and a processing engine (see Fig. 11, block 42B) communicatively coupled to the demodulator unit and configured for generating a total interference vector ( $I_n$ ) that is a linear combination of one or more interference vectors (see column 20, lines 44 - 66), wherein each of the

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interference vectors comprises a component of an interfering signal and wherein the vector is used to cancel the interference from the strongest signal (see column 27, lines 20-28 and column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference.

**Applicants' Argument:** Applicants argue that Affes does not teach linearly combining the vectors to form a composite interference vector.

**Examiner's Response:** Examiner respectfully disagrees. Examiner asserts that Affes shows that the total interference vector is a linear combination of one or more interference vectors (see column 20, lines 53-65).

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-9, 12-14, 16- 21, 24-29, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Madhow et al. (hereafter, referred as Madhow) (US 6,175,587), in view of Affes et al. (hereafter, referred as Affes) (US 6,975,666).

As to claim 1, Madhow discloses a demodulator unit (see Fig. 2 (220)) configured for demodulating one or more of a plurality of signals (see Fig. 2); and

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a processing engine 400 (see Figs. 3 and 4) communicatively coupled to the demodulator unit (Fig. 2 (220)) and configured for generating interference vectors (column 6 (specially line 58), column 7, lines 1- 5, 16-37, and column 8, lines 10-13), wherein each of the interference vectors comprises a component of an interfering signal (column 9, lines 31-67 and column 10, lines 1-6) and wherein the vectors are used to selectively substantially reduce energy from one or more of the signals (column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow discloses all the subject matters claimed in claim 1, except that the processor generates a vector which is a linear combination of one or more interference vectors. Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18); and a processing engine (see column 22, lines 54-56 and Fig. 11, block 42B) communicatively coupled to the demodulator unit and configured for generating a vector ( $\underline{I}_n$ ) that is a linear combination of one or more interference vectors (see column 20, lines 44-65), wherein each of the interference vectors comprises a component of an interfering signal and wherein the vector is used to cancel the interference from the strongest signal (see column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference.

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As to claim 2, Madhow discloses a searcher finger 114 configured for selecting signals for demodulation from the plurality of signals and for determining one or more codes from selected signals (see column 4, lines 44-46 and Fig. 2).

As to claim 3, Madhow discloses that the demodulator unit comprises a plurality of demodulator fingers configured for demodulating the selected signals (see Figs. 1 and 2).

As to claim 4, Madhow further discloses that the determined codes comprise code offsets in time from one another (see column 4, lines 6-8 and column 8, lines 55-57).

As to claims 5, Affes further discloses that the vector comprises a composite interference vector (see column 20, lines 53-57) constructed using code information and amplitude information (see column 4, lines 38-52 and column 20, lines 21-36). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to suppress the interference more effectively.

As to claim 6, Madhow further discloses that the demodulator unit is assigned to at least one of a multipath signal from a base station in soft handoff with the mobile unit or to a strong multipath signal from a base station not in soft handoff (see column 8, lines 14-19).

As to claim 7, Madhow further discloses that a radio frequency front end configured for receiving the signals (column 4, lines 26-31).

As to claim 8, Madhow further shows (see Fig. 4 (402,404)) that the processing engine comprises a channel selector configured for selecting components of the determined codes from signals selected for energy reduction (column 7, lines 29-49, column 8, lines 40-60).

As to claims 9, 21, and 29, Madhow further discloses that the processing engine is further configured to generate, a cancellation operator used to substantially reduce the energy of the signals selected for energy reduction (column 7, lines 6-33, column 8, lines 40-60, column 10, lines 3-12).

As to claim 12, Madhow further discloses that the determined codes are spreading codes (see column 3, lines 66).

As to claim 13, Affes discloses that the spreading coded used is a short code (see column 12, lines 7-13). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to make the process of interference reduction more convenient (see column 12, lines 12-13).

As to claim 14, Madhow discloses that the processing engine further correlates a despread received signal against a plurality of Walsh codes covering code is selected from a group consisting of a Walsh (see column 5, lines 34-36).

As to claims 16 and 24, Madhow discloses a demodulator unit (see Fig. 2 (220)) configured for demodulating one or more of a plurality of signals (see Fig. 2); constructing at least one interference vector (see column 6) from the at least one demodulated signal of a plurality of signals; wherein the at least one interference vector comprises components of an interfering signal (column 9,



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lines 31-67, column 10, lines 1-6); wherein the vectors are used to selectively substantially reduce energy from one or more of the signals (column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow discloses all the subject matters claimed in claims 16 and 24, except for generating a vector that is a linear combination of one or more interference vectors. Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18). Affes further discloses generating a vector ( $\underline{I}_n$ ) that is a linear combination of one or more interference vectors (see column 20, lines 44-65), wherein each of the interference vectors comprises a component of an interfering signal. Affes further discloses that the vector is used to cancel the interference from the strongest signal (see column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference.

As to claims 17 and 25, Madhow further discloses searching for one or more signals from the plurality of signals for assigning to at least one demodulating unit (see Figs. 1 and 2).

As to claims 18 and 26, Madhow discloses determining one or more codes for signals assigned to the demodulating unit selected from the plurality of signals (see Fig. 2).

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As to claims 19 and 27, Affes discloses summing a plurality of the interference vectors to form a composite interference vector (see column 20). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21).

As to claims 20 and 28, Affes further discloses that the vector comprises a composite interference vector (see column 20, lines 53-55) constructed using code information and amplitude information (see column 4, lines 38-44 and column 25, lines 37-41). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes to suppress the interference more effectively.

As to claim 32, Madhow discloses a processing engine 400 (see Figs. 3 and 4) configured for generating a plurality of interference vectors (see column 6, lines 55-60), wherein each of vectors comprises a component of an interfering signal (column 9, lines 31-67, column 10, lines 1-6) and wherein the vectors used to selectively substantially reduce energy from one or more of the signals (column 6, lines 65-67, column 7, lines 29-65, column 8, lines 40-49, column 9, lines 17-26, 31-67, column 10, lines 1-6, 8-13). Madhow discloses all the subject matters claimed in claim 32, except for a composite interference vector which is generated based on a linear combination of one or more interference vectors. Affes, in the same field of endeavor, shows a receiver (see Fig. 11), comprising: a demodulator unit (see column 15, lines 31 and 32) configured for demodulating one or more of a plurality of signals (see Fig. 11, block 18); and a processing

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engine (see column 22, lines 54-56 and Fig. 11, block 42B) communicatively coupled to the demodulator unit and configured for generating a vector ( $I_n$ ) (interpreted as composite interference vector) that is a linear combination of one or more interference vectors (see column 20, lines 44-65), wherein each of the interference vectors comprises a component of an interfering signal and wherein the vector is used to cancel the interference from the strongest signal (see column 48, lines 6-12). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow as suggested by Affes, to reduce the complexity of calculations (see column 23, lines 17-21) by using a combination of vectors to reduce the interference.

4. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Madhow and Affes, further in view of Applicants' background of invention.

As to claim 15, Madhow and Affes disclose all the subject matters claimed in claim 1, except that the signals are selected from a group consisting of cdma2000 and cdmaOne signals. Applicants in the background of invention further disclose that the signals are selected from a group consisting of cdma2000 signals and cdmaOne signals (see page 2). It would have been obvious to one of ordinary skill in the art at the time of invention to modify Madhow and Affes as suggested by Applicant's background of invention to take advantage of higher data rates in the system.

***Allowable Subject Matter***

5. Claims 10, 11, 22, 23, 30, and 31 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leila Malek whose telephone number is 571-272-8731. The examiner can normally be reached on 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Leila Malek  
Examiner  
Art Unit 2611

/L.M./  
/Leila Malek/  
Examiner, Art Unit 2611

/Mohammad H Ghayour/  
Supervisory Patent Examiner, Art Unit 2611